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The embryo-sac of the Metaspermæ.—Hartog in the Dec. 1891 number of the *Quarterly Journal of Microscopical Science* suggests that the eight cells in the embryo-sac of the Metaspermæ are all to be considered as reproductive and follows the later view that the endosperm nucleus is a zygote. In a foot-note he retracts this position, in consequence of Guignard's work on the embryo-sac of *Lilium*. The writer a short time ago sent to the GAZETTE a statement of the same position as that first maintained by Hartog; but upon seeing his paper the preliminary note was withdrawn. In view of my own observation I am not, however, inclined to withdraw with Hartog from what seems to me the clear fact that the embryo-sac is, wherever we meet it, a *megaspore*. I do not think that the results of Guignard at all prevent us from holding to the view that the cells within the embryo-sac are, in Archispermæ and Metaspermæ alike, a female plant. At a later time I hope to discuss this point. In this brief note attention is directed to one fact which has escaped the late investigations, I believe. It is this: in the embryo-sacs of *Narcissus poeticus*, *Portulaca oleracea*, and *Cucurbita pepo* the micropylar nucleus, that is the sister nucleus of the egg, stains as does the *sperm* nucleus from the pollen-tube of the same species. The antipodal nucleus that fuses with this micropylar nucleus to form the definitive nucleus stains as an *egg*. That is to say, the micropylar nucleus stains about twice as quickly as the antipodal in both methyl-green and safranin. It has numerous, deeply stained chromatin bodies (chromosomes or chromatomes) and the nucleoli are of a greater number than in the antipodal nucleus. In a number of other ways that might be named the antipodal nucleus reacts as an egg while the micropylar nucleus reacts as a sperm. It is clear that this can be explained either upon the hypothesis of Weissmann that the micropylar nucleus is histogenic, upon that of Hartog that it is an arrested gamete, or, best of all, upon that of Minot, Balfour and Van Beneden, that it is the male substance thrown off as a polar body and to make room for the similar but more distant substance of the sperm-nucleus. It is therefore improper to say as Hartog does that the definitive nucleus is a zygote, for there is a clear morphological distinction (that of size), beside the physiological one given, between the two fusing nuclei. Undoubtedly this fusion is a sexual act and the antipodal nucleus after it has been fertilised is enabled to pass into the segmentation phase and actually builds up a body, the endosperm, which is, however, always dependently situated with regard to the more virile, cross fertilised, embryo-producing egg-cell. The views of Warming, Mann,¹ Vesque, and Guignard, or the later view of Hartog, that these cells are any or

¹See BOT. GAZETTE, this vol., p. 104.

all of them spores or the homologues of spores, seem to draw little support from the fact recorded. It is well said though by Hartog that the whole eight-cell group should be considered as egg-organs and not in any part as prothallium. I made this point in the note that was withdrawn, from a consideration of the staining phenomena mentioned above, and it seems not unlikely that it will be supported. It is very evident that the endosperm of the Metaspermæ is a different structure from that of the Archispermæ. It is probable that the two types are to be referred to different generations, that of the Archispermæ to the gametophytic and that of the Metaspermæ to the sporophytic.—CONWAY MACMILLAN, *University of Minnesota*.

A bit of the flora of Central Arizona.—During July and August of last year I was collecting plants and studying the flora of Central Arizona. While *en route* for Camp Verde by the old Black Cañon stage route between Phoenix and Prescott, I stopped for two days at Big Bug. This is a small mining camp and stage station some eighty miles north of Phoenix. During my sojourn here, I found in a deep cañon several miles northwest of the station as interesting a bit of flora as I have seen since coming to the territory.

As we leave the flat sandy desert, which extends for some distance north of Phoenix, and enter the mountainous region, there is almost an entire change in the floral aspect of the country. At this season of the year the only conspicuous vegetation on the sandy mesa that could be observed from the top of the stage coach were several species of cacti and the creosote bush, *Larea Mexicana* Moric. This shrub grows in nearly all parts of Southern Arizona, and is perfectly at home upon the driest mesa, where, in some years, it is without rain for several continuous months. It has surface roots and frequently grows upon a hard, rocky subsoil. No doubt the gum which covers the leaves like a coat of varnish aids greatly in retarding the evaporation of moisture.

Of the species of cacti found here, *Cereus giganteus* Engelm., *Echinocactus Wislizeni* Engelm., and the great tree cactus, *Opuntia arborescens* Engelm., are the first to catch the traveller's eye.

There is a marked variation in the forms of this latter species as found in the various parts of the territory. This variation is noticeable in length of spines, relative length of joints, color, and in the general aspect of the plant. It is possible that some of these forms may constitute varietal differences, or even specific ones, under more extended study.

As we reached the mountains, our route brought us to the Agua Fria River, which in July was almost dry. The banks of this stream,